Red Hat CloudForms 2.0 Management Engine 5.1 Quick Start Guide

An introduction to using CloudForms Management Engine's main features
Edition 1

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Abstract

Red Hat CloudForms 2.0 Management Engine 5.1

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Preface

Chapter 1. About Red Hat CloudForms

CloudForms Management Engine delivers the insight, control, and automation enterprises need to address the challenges of managing virtual environments, which are far more complex than physical ones. This technology enables enterprises with existing virtual infrastructures to improve visibility and control, and those just starting virtualization deployments to build and operate a well-managed virtual infrastructure.

Red Hat CloudForms 2.0 is comprised of a single component, the CloudForms Management Engine. It has the following feature sets:

- Insight: Discovery, Monitoring, Utilization, Performance, Reporting, Analytics, Chargeback, and Trending.

- Control: Security, Compliance, Alerting, Policy-Based Resource and Configuration Management.

- Automate: IT Process, Task and Event, Provisioning, Workload Management and Orchestration.

- Integrate: Systems Management, Tools and Processes, Event Consoles, CMDB, RBA, and Web Services.

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1.1. Architecture

The diagram below describes the capabilities of CloudForms Management Engine. Its features are designed to work together to provide robust management and maintenance of your virtual infrastructure.
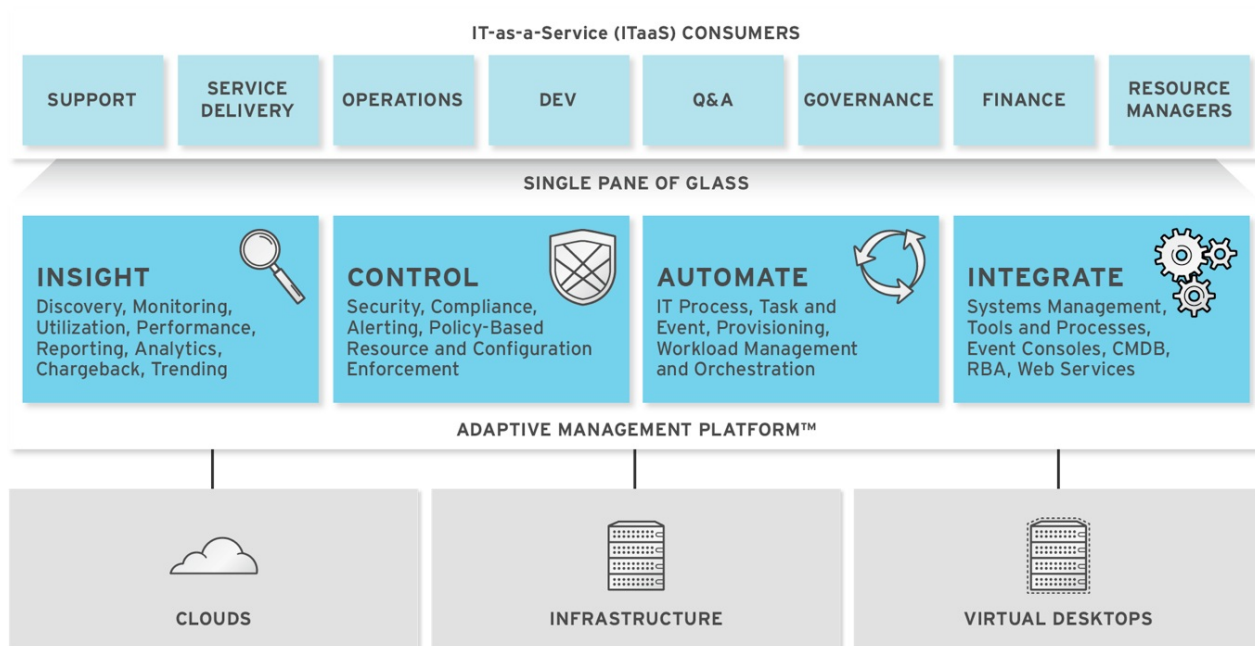
Figure 1.1. Architecture

The architecture is composed of the following components:

❯❯ The CloudForms Management Engine Appliance (Appliance) which is supplied as a secure, high-performance, pre-configured virtual machine. It provides support for Secure Socket Layer (SSL) communications.

❯❯ The CloudForms Management Engine Server (Server) resides on the Appliance. It is the software layer that communicates between the SmartProxy and the Virtual Management Database. It includes support for Secure Socket Layer (SSL) communications.

❯❯ The Virtual Management Database (VMDB) resides either on the Appliance or another computer accessible to the Appliance. It is the definitive source of intelligence collected about your Virtual Infrastructure. It also holds status information on tasks of the Appliance.

❯❯ The CloudForms Management Engine Console (Console) is your Web interface used to view and control the Server Appliance. It is easily consumed through Web 2.0 mash-ups and web services (WS Management) interfaces.

❯❯ The SmartProxy can reside on the Appliance or on an ESX Server. If not embedded in the Server, the SmartProxy can be deployed from the Appliance. Each storage location must have a SmartProxy with visibility to it. The SmartProxy acts on behalf of the Appliance communicating with it over HTTPS (SSL) on standard port 443.

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1.2. Terminology

The following terms are used throughout this document. Review them before proceeding.

Account Role

A designation assigned to a user allowing or restricting a user to parts and functions of the CloudForms Management Engine console.

Action

An execution that is performed after a condition is evaluated.

Alert

CloudForms Management Engine alerts are used to notify administrators and monitoring systems on critical configuration changes and threshold limits in your virtual environment. The notification can take the form of either an e-mail or an SNMP trap.

Analysis Profile

A customized scan of virtual machines or hosts. You can collect information from categories, files, event logs, and registry entries.

Cluster

Hosts that are grouped together to provide high availability and load balancing.

Condition

A test of criteria triggered by an event.

Discovery

Process run by the CloudForms Management Engine server which finds virtual machine monitors and management systems.

Drift

The comparison of a virtual machine, host, or cluster to itself at different points in time.

Event

A trigger to check a condition.

Event Monitor

Software on the CloudForms Management Engine Appliance which monitors external management systems for events and sends them to the CloudForms Management Engine server.

CloudForms Management Engine Appliance

A virtual machine on which the virtual management database (VMDB) and CloudForms Management Engine server reside.

CloudForms Management Engine Console

A web-based interface into the CloudForms Management Engine Appliance.

CloudForms Management Engine Role

A designation assigned to a CloudForms Management Engine server that defines what a CloudForms Management Engine server can do.

CloudForms Management Engine Server

The application that runs on the CloudForms Management Engine Appliance and communicates with the SmartProxy and the VMDB.

Host

A computer on which virtual machine monitor software is loaded.

Managed/Registered VM

A virtual machine that is connected to a host and exists in the VMDB. Also, a template that is connected to a management system and exists in the VMDB. Note that templates cannot be connected to a host.

Managed/Unregistered VM

A virtual machine or template that resides on a repository or is no longer connected to a management system or host and exists in the VMDB. A virtual machine that was previously considered registered may become unregistered if the virtual machine was removed from management system inventory.

Management System

A computer on which software is loaded which manages multiple virtual machines that reside on multiple hosts.

Policy

A combination of an event, a condition, and an action used to manage a virtual machine.

Policy Profile

A set of policies.

Refresh

A process run by the CloudForms Management Engine server which checks for relationships of the management system or host to other resources, such as storage locations, repositories, and virtual machines. It also checks the power states of those resources.

Resource

A host, management system, virtual machine, repository, or datastore.

Resource Pool

A group of virtual machines across which CPU and memory resources are allocated.

Repository

A place on a datastore resource which contains virtual machines.

SmartProxy

The SmartProxy can be configured to reside on the CloudForms Management Engine

Appliance or on an ESX server version. The SmartProxy can be deployed from the CloudForms Management Engine Appliance, and provides visibility to the VMFS storage. Each storage location must have a SmartProxy with visibility to it. The SmartProxy acts on behalf of the CloudForms Management Engine Appliance. If the SmartProxy is not embedded in the CloudForms Management Engine server, it communicates with the CloudForms Management Engine Appliance over HTTPS (SSL) on standard port 443.

SmartState Analysis

Process run by the SmartProxy which collects the details of a virtual machine such as accounts, drivers, network information, hardware, and security patches. This process is also run by the CloudForms Management Engine server on hosts and clusters. The data is stored in the VMDB.

SmartTags

Descriptors that allow you to create a customized, searchable index for the resources in your virtual infrastructure.

Storage Location

A device, such as a VMware datastore, where digital information resides that is connected to a resource.

Tags

Descriptive terms defined by a CloudForms Management Engine user or the system used to categorize a resource.

Unmanaged VM

Files discovered on a datastore that do not have a virtual machine associated with them in the VMDB. These files may be registered to a management system that the CloudForms Management Engine server does not have configuration information on. Possible causes may be that the management system has not been discovered or that the management system has been discovered, but no security credentials have been provided.

Virtual Management Database (VMDB)

Database used by the CloudForms Management Engine Appliance to store information about your resources, users, and anything else required to manage your virtual enterprise.

Virtual Thumbnail

An icon divided into smaller areas that summarize the properties of a resource.

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Chapter 2. Installing on Red Hat Enterprise Virtualization Manager

2.1. Obtaining the CloudForms Management Engine Appliance

Download the CloudForms Management Engine appliance in ovf format from the Red Hat Customer Portal using the following instructions.

Procedure 2.1. To download the CloudForms Management Engine appliance

1. Go to **access.redhat.com** and log into the Red Hat Customer Portal using your Customer Account Details.

2. Navigate to **Downloads → Red Hat Enterprise Linux → Channels**.

3. From the **Filter by Product Channel** section, select **Red Hat CloudForms**.

4. Expand **Red Hat Enterprise Linux Server 5** and click on the desired architecture (**x86_64**) for **Red Hat CloudForms (Management Engine)**.

5. Click the **Downloads** tab.

6. Click the **Red Hat Virtual Appliance** download link.

Result:

The CloudForms Management Engine appliance downloads to your local machine.

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2.2. Uploading the CloudForms Management Engine Appliance

Uploading the CloudForms Management Engine appliance file onto Red Hat Enterprise Virtualization Management systems has the following requirements:

▸ 44 GB of storage space on both the export domain and the local partition where **/tmp** resides since the ovf is locally expanded into that directory.

▸ Install the **rhevm-image-uploader** package to your local machine.

```
# yum install rhevm-image-uploader
```

It is recommended to use **-v** (verbose logging) when using the **rhevm-image-uploader** script to see the progression of the upload.

▸ Depending on your infrastructure, allow approximately 90 minutes for the upload.

▸ Once the OVF is uploaded and imported as a template, add a network adapter to the template itself.

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2.2.1. Virtual Machine Image Uploader

Using the rhevm-image-uploader command, you can list export storage domains and upload virtual machines in Open Virtualization Format (OVF) to an export storage domain and have them automatically recognized in the Red Hat Enterprise Virtualization Manager. The tool only supports gzip compressed OVF files created by Red Hat Enterprise Virtualization.

The image uploader makes creating distributable virtual machine images practical.

The archive should contain images and master directories that are in the following format:

```
|-- images
|   |-- [Image Group UUID]
|        |--- [Image UUID (this is the disk image)]
|        |--- [Image UUID (this is the disk image)].meta
|-- master
|   |---vms
|       |--- [UUID]
|              |--- [UUID].ovf
```

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2.2.1.1. Syntax for the rhevm-image-uploader Command

The basic syntax for the image uploader command is:

```
rhevm-image-uploader [options] list
rhevm-image-uploader [options] upload [file].[file]...[file]
```

The two supported modes of operation are *list* and *upload*.

» The *list* parameter lists the valid export storage domains available for image uploads.

» The *upload* parameter uploads selected image file(s) to the specified image storage domain.

The image uploader command requires either the *list* or *upload* parameter be included for basic usage. The *upload* parameter requires a minimum of one local file name to upload.

There are numerous parameters to further refine the **rhevm-image-uploader** command. You can set defaults for any of these in the **/etc/ovirt-engine/imageuploader.conf** file.

General Options

> *-h, --help*
>
>> Displays command usage information and returns to prompt.
>
> *--conf-file=PATH*
>
>> Sets *PATH* as the configuration file the tool is to use. The default is **etc/ovirt-engine/imageuploader.conf**.
>
> *--log-file=PATH*
>
>> Sets *PATH* as the specific file name the command should use for the log output.
>
> *--quiet*
>
>> Sets quiet mode, reducing console output to a minimum. Quiet mode is off by default.

-v, --verbose

Sets verbose mode, providing more console output. Verbose mode is off by default.

-f, --force

Force mode is necessary when the source file being uploaded has an identical file name as an existing file at the destination; it forces the existing file to be overwritten. Force mode is off by default.

Red Hat Enterprise Virtualization Manager Options

-u USER, --user=USER

Sets the user associated with the file to be uploaded. The *USER* is specified in the format *user@domain*, where *user* is the user name and *domain* is the directory services domain in use. The user must exist in directory services and be known to the Red Hat Enterprise Virtualization Manager.

-r FQDN, --rhevm=FQDN

Sets the fully qualified domain name of the Red Hat Enterprise Virtualization Manager server from which to upload images, where *FQDN* is replaced by the fully qualified domain name of the Manager. It is assumed that the image uploader is being run on the same client machine as the Red Hat Enterprise Virtualization Manager; the default value is `localhost:443`.

Export Storage Domain Options

These options specify the export domain to which files are uploaded. They are alternatives; do not use these parameters together.

-e, --export-domain=EXPORT_DOMAIN

Sets the storage domain *EXPORT_DOMAIN* as the destination for uploads.

-n, --nfs-server=NFSSERVER

Sets the NFS path *NFSSERVER* as the destination for uploads.

-i, --ovf-id

Use this option if you do not want to update the UUID of the image. By default, the tool will generate a new UUID for the image. This ensures that there is no conflict between the id of the incoming image and those already in the environment.

-d, -disk-instance-id

Use this option if you do not want to rename the instance ID for each disk (i.e. InstanceId) in the image. By default, this tool will generate new UUIDs for disks within the image to be imported. This ensures that there are no conflicts between the disks on the imported image and those within the environment.

-m, --mac-address

Use this option if you do not want to remove the network components from the image that will be imported. By default, this tool will remove any network interface cards from the image to prevent conflicts with network cards on other virtual machines within the environment. Once the image has been imported, use the Administration Portal to add network interface cards back and the Manager will ensure that there are no MAC address conflicts.

-N *NEW_IMAGE_NAME*, **--name=***NEW_IMAGE_NAME*

Supply this option if you want to rename the image.

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2.2.2. Uploading the Appliance with the Image Uploader

The following procedure uploads the CloudForms Management Engine appliance using the Image Uploader tool.

Procedure 2.2. To upload the CloudForms Management Engine appliance

1. Change to the directory containing the CloudForms Management Engine appliance.

2. Run the following command:

   ```
   # rhevm-image-uploader -ev myexportdomain upload evm-v5.1.0.4-r.ovf
   ```

   Substitutde the *myexportdomain* with your chosen Export storage domain.

3. Enter your Red Hat Enterprise Virtualization Manager login details when prompted.

   ```
   Please provide the REST API username for RHEV-M: admin@internal
   Please provide the REST API password for the admin@internal RHEV-M
   user: **********
   ```

   > **Important**
   >
   > Make sure your Red Hat Enterprise Virtualization Manager has administrator access to the chosen Export storage domain.

Result:

The Image Uploader tool begins uploading the CloudForms Management Engine appliance.

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2.2.3. Uploading the Appliance without the Image Uploader

The following procedure provides manual upload instructions if the Image Uploader tool is not available or fails to upload.

Procedure 2.3. To manually upload the CloudForms Management Engine appliance

1. Log into a host in your Red Hat Enterprise Virtualization with a mount to the Export storage domain.

2. Change to the Export storage domain's directory.

3. Copy the CloudForms Management Engine appliance ovf to this directory.

4. Extract the ovf file using **tar**.

```
tar xvf evm-v5.1.0.4-r.ovf
```

Result:

The CloudForms Management Engine appliance manually extracts to your Export storage domain.

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2.3. Running CloudForms Management Engine

After uploading the appliance to the Export storage domain, import it as a template and create a virtual machine. Use the following procedure as a guide.

Procedure 2.4. To create and run CloudForms Management Engine

1. Import the appliance from the Export storage domain as a template in a Red Hat Enterprise Virtualization Data storage domain. See the *Red Hat Enterprise Virtualization Administrator Guide* for instructions.

2. Once the import is complete, add a network interface (NIC) to the template.

3. Create a new virtual machine using the CloudForms Management Engine appliance template as a basis. See the *Red Hat Enterprise Virtualization Administrator Guide* for instructions.

4. Start the newly created CloudForms Management Engine appliance virtual machine

Result:

Your Red Hat Enterprise Virtualization environment now contains a running CloudForms Management Engine appliance.

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Chapter 3. Installing on VMware vSphere

3.1. Obtaining the CloudForms Management Engine Appliance

Download the CloudForms Management Engine appliance in OVF format from the Red Hat Customer Portal using the following instructions.

Procedure 3.1. To download the CloudForms Management Engine appliance

1. Go to **access.redhat.com** and log into the Red Hat Customer Portal using your Customer Account Details.

2. Navigate to **Downloads → Red Hat Enterprise Linux → Channels**.

3. From the **Filter by Product Channel** section, select **Red Hat CloudForms**.

4. Expand **Red Hat Enterprise Linux Server 5** and click on the desired architecture (**x86_64**) for **Red Hat CloudForms (Management Engine)**.

5. Click the **Downloads** tab.

6. Click the **Red Hat Virtual Appliance** download link.

Result:

The CloudForms Management Engine appliance downloads to your local machine.

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3.2. Uploading the CloudForms Management Engine Appliance

Uploading the CloudForms Management Engine appliance file onto Red Hat Enterprise Virtualization Management systems has the following requirements:

» 44 GB of space on the chosen vSphere datastore.

» Administrator access to the vSphere Client.

» Depending on your infrastructure, allow approximately 90 minutes for the upload.

Use the following procedure to upload the CloudForms Management Engine Appliance OVF template from your local file system using the vSphere Client.

1. In the vSphere Client, select **File → Deploy OVF Template**. The Deploy OVF Template wizard appears.

2. Specify the source location and click **Next**.

    » Select **Deploy from File** to browse your file system for the OVF template.

    » Select **Deploy from URL** to specify a URL to an OVF template located on the internet.

3. View the **OVF Template Details** page and click **Next**.

4. Select the deployment configuration from the drop-down menu and click **Next**. The option selected typically controls the memory settings, number of CPUs and reservations, and application-level configuration parameters.

5. Select the host or cluster on which you want to deploy the OVF template and click **Next**.

6. Select the host on which you want to run the deployed OVF template, and click **Next**.

7. Navigate to, and select the resource pool where you want to run the OVF template and click **Next**.

8. Select a datastore to store the deployed OVF template, and click **Next**. Ensure to select a datastore large enough to accommodate the virtual machine and all of its virtual disk files.

9. Select the disk format to store the virtual machine virtual disks, and click **Next**.

   » Select **Thin Provisioned** if tThe storage is allocated on demand as data is written to the virtual disks.

   » Select **Thick Provisioned** if all storage is immediately allocated.

10. For each network specified in the OVF template, select a network by right-clicking the **Destination Network** column in your infrastructure to set up the network mapping and click **Next**.

11. On the **IP Allocation** page, configure how IP addresses are allocated for the virtual appliance and click **Next**.

    » Select **Fixed** to be prompted to enter the IP addresses in the Appliance Properties page.

    » Select **Transient** if IP addresses are allocated from a specified range when the appliance is powered on. The IP addresses are released when the appliance is powered off.

    » Select **DHCP** if a DHCP server is used to allocate the IP addresses.

12. Set the user-configurable properties and click **Next**. The properties to enter depend on the selected IP allocation scheme. For example, you are prompted for IP related information for the deployed virtual machines only in the case of a fixed IP allocation scheme.

13. Review your settings and click **Finish**.

Result:

The progress of the import task appears in the vSphere Client Status panel.

Chapter 4. CloudForms Management Engine Console

The CloudForms Management Engine Console (Console) is a web interface used to manage your virtual environment. It is highly customizable and allows easy access to your management tasks.

> **Note**
>
> While the Server is starting, you will not be able to log in to the Console. The Console will retry connecting every 10 seconds until all workers and processes have started.

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4.1. Console Requirements

To access the CloudForms Management Engine console (console), you must have one of the following Web Browsers:

- Mozilla Firefox for versions supported under Mozilla's Extended Support Release (ESR) [1]

- Internet Explorer 8 or higher

You will need a monitor with minimum resolution of 1280x1024 and Adobe Flash Player 9 or above. At the time of this writing, you can access it at http://www.adobe.com/products/flashplayer/

> **Note**
>
> Due to browser limitations, Red Hat supports logging in to only one tab for each multi-tabbed browser. Console settings are saved for the active tab only. For the same reason, CloudForms Management Engine does not guarantee that the browser's Back button will produce the desired results. CloudForms Management Engine recommends using the breadcrumbs provided in the console.

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4.2. Accessing the Console

Login to the CloudForms Management Engine Console using the following procedure.

Procedure 4.1. To access the CloudForms Management Engine Console

1. From a computer with network access to the CloudForms Management Engine Appliance, open your Web browser.

2. Go to **https://<CloudForms Management Engine Appliance IP>.**

3. Read and accept any security certificate dialogs.

4. Log in to the Console with a user name of **admin** and the default password.

Result:

The CloudForms Management Engine Console now displays.

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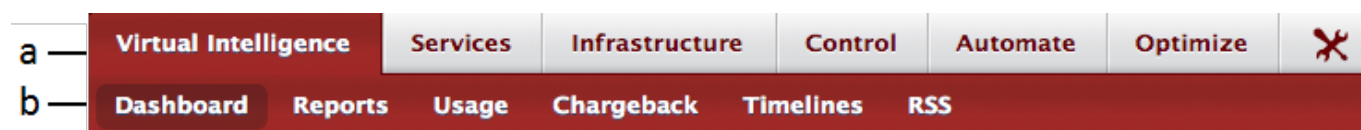
4.3. Navigating the Console

Figure 4.1. CloudForms Management Engine's main navigation menu

1. Primary Navigation Bar

2. Secondary Navigation Bar

Click an item on the Primary Navigation Bar to go to that category. Then, you can click on a secondary item to refine the type of function.

The Console consists of the following items on the Primary Navigation Bar:

▷ **Virtual Intelligence** uses Really Simple Syndication (RSS) feeds and charts to display information on your virtual enterprise devices. It also includes reports both out of the box and custom.

▷ **Services** provides a view of all of your discovered Virtual Machines and Catalogs of Virtual Machines.

▷ **Infrastructure** allows you to see your Management Systems, Clusters, Hosts, Resource Pools, Datastores, and Repositories.

▷ **Control** defines your policies using Events, Conditions, and Actions.

▷ **Automate** provides models for process integration and adaptive automation for events and activities.

▷ **Optimize** allows you to identify bottlenecks and plan placement of Virtual Machines.

In addition to the items on the navigation bar, you can also use (Settings and Operations) to manage the user interface, create tags, set server, database and SmartProxy options, administer users, and update the software and view the documentation.

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[1] http://www.mozilla.org/en-US/firefox/organizations/faq/

Chapter 5. Management Systems

A management system is a server with software to manage multiple virtual machines that reside on multiple hosts. The **Management Systems** page displays all discovered or added management systems in your enterprise.

> **Note**
>
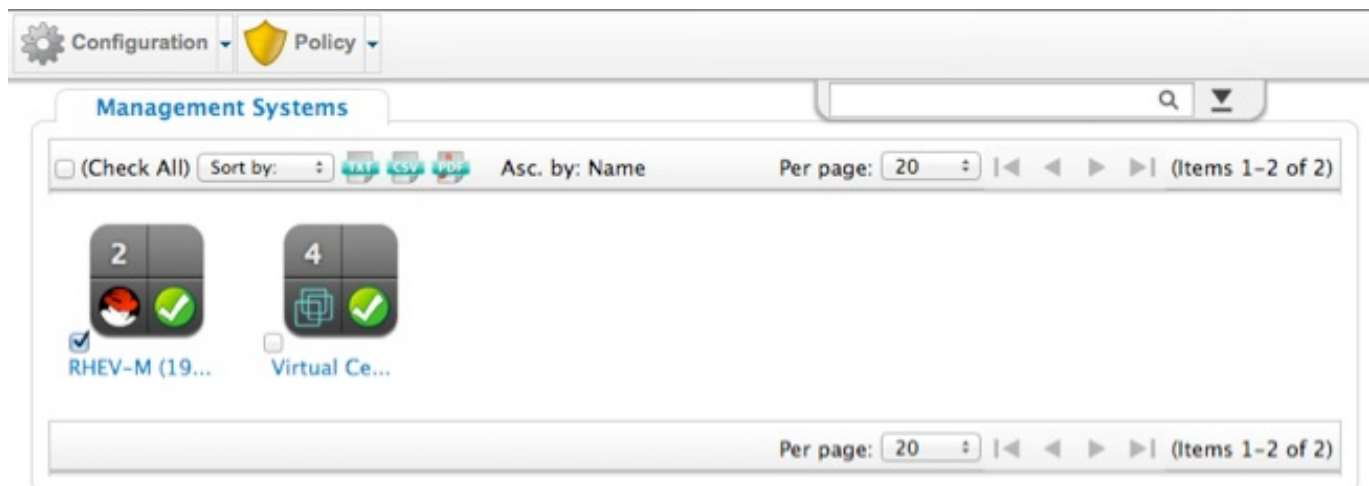> Any applied filters will be in effect on this page.

Figure 5.1. The Management Systems page

Use the **Management Systems** taskbar to manage the existence and refresh of your management systems. These buttons are used to manage multiple management systems at one time. To manage one management system, click on that item in the main area of the screen.

Console uses virtual thumbnails to describe management systems. Each thumbnail contains four quadrants by default. This allows a user to glance at a management system for a quick view of its number of hosts and authentication status.

1. Top left quadrant: Number of hosts

2. Bottom left quadrant: Management system software

3. Top right quadrant: For future use

4. Bottom right quadrant: Authentication status

Icon	Description
	Validated: Valid authentication credentials have been added.
	Invalid: Authentication credentials are invalid.
	Unknown: Authentication status is unknown or no credentials have been entered.

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5.1. Adding a Management System

After initial installation and creation of a CloudForms Management Engine environment, add management systems to the appliance with the following procedure.

Procedure 5.1. To add a management system

1. Navigate to **Infrastructure → Management Systems**.

2. Click ⚙ (Configuration).

3. Click ➕ (Add a New Management System).

4. Type in the **Name**, **Host Name**, and **IP Address** of the management system to add. The **Name** is how the device is labeled in the console.

5. Select the **Type** of management system: **Amazon EC2**, **Red Hat Enterprise Virtualization Manager**, or **VMware vCenter**.

6. If you have multiple zones, select the appropriate one from **Zone**.

7. Type in a **User ID** and **Password** with administrator privileges to the management system. To refresh a management system, these credentials are required.

8. Click **Validate** to confirm that the user and password connects.

9. Click **Save**.

Result:

CloudForms Management Engine adds a new management system. Use this management system for virtual machine provisioning.

> **Note**
>
> To obtain historical Capacity and Utilization data for Red Hat Enterprise Virtualization Manager, you will need to add credentials for the Red Hat C & U Database. Once discovered, and set up for C & U in CloudForms Management Engine, you can use CloudForms Management Engine to collect C & U from this point forward. For further information, refer to *Chapter 4. Data Collection Setup and Reports Installation* in the *Red Hat Enterprise Virtualization 3.1 Installation Guide*.

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5.2. Discovering Management Systems

After initial creation of a CloudForms Management Engine environment, discover the management systems in your environment. To do this, use CloudForms Management Engine's ability to discover using a range of IP addresses.

Procedure 5.2. To discover management systems by subnet range

1. Navigate to **Infrastructure → Management Systems**.

2. Click ⚙ (Configuration).

3. Click 🟢 (Discover Management Systems).

4. Check the type of management system to discover.

5. Type in a **Subnet Range** of IP addresses staring with a **From Address** and ending with a **To Address**. The cursor automatically advances as you complete each octet.

6. Click **Start** to confirm the discovery process.

Result:

The server searches for computers running supported management systems. When available, the new management systems display. These management systems are named using a Hostname and IP address. To make them identifiable, edit the basic information for each management system.

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5.3. Editing Management System Information

Edit information about a management system such as the name, IP address, and login credentials.

Procedure 5.3. To edit management system information

1. Navigate to **Infrastructure → Management Systems**.

2. Click the management system to edit.

3. Click [icon] (Configuration), and then [icon] (Edit this Management System).

4. In **Basic Info**, edit the following:

   ⯈ Use **Name** to set an easily identifiable name for the management system.

   ⯈ Use **Host Name** to specify the hostname for the device.

   ⯈ Use **IP Address** to set the IP address for communication with the management system.

   ⯈ You cannot change the **Type** of management system.

   ⯈ Use **Zone** to isolate traffic and provide load balancing capabilities. Specify the **Zone** this CloudForms Management Engine Appliance is a member. At startup, the zone is set to **Default**.

5. Use **Credentials** to provide login credentials required for the management system.

User ID	acme/dunn
Password	•••••••••
Verify Password	•••••••••

   ⯈ Use **User ID** to specify a login name.

   ⯈ Use **Password** to specify the password for the **User ID**.

   ⯈ Use **Verify Password** to confirm the password.

> **Note**
>
> To collect historical Capacity & Utilization Data from Red Hat Enterprise Virtualization Manager, also add credentials for the Red Hat C & U Database.

6. Click **Validate** to confirm the user and password connects.

7. Click **Save**.

Result:

The management system settings are updated and the changes take effect immediately.

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5.4. Refreshing Management Systems

Refresh a management system to find other resources related to it. Use **Refresh** after initial discovery to get the latest data about a virtual machine the management system or host has access. Ensure the management system has credentials to do this. If the management systems was added using **Discovery**, see *Editing Management System Information*.

Procedure 5.4. To refresh multiple management systems

1. Navigate to **Infrastructure → Management Systems**.

2. Check the management systems to refresh.

3. Click (Configuration), and then (Refresh Relationships and Power States).

4. Click **OK** to confirm the refresh.

Result:

The chosen management systems are refreshed.

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Chapter 6. Hosts

The **Hosts** page under **Infrastructure** displays the hosts discovered in your enterprise environment.

> **Note**
>
> Any applied filters will be in effect here.

After adding or sorting your hosts, click on one to examine it more closely and see its virtual machines, SmartProxy settings, and properties.

1. Top left quadrant: Number of virtual machines on this host

2. Bottom left quadrant: Virtual machine software

3. Top right quadrant: Power state of host

4. Bottom right quadrant: Authentication status

Icon	Description
	Validated: Valid authentication credentials have been added.
	Invalid: Authentication credentials are invalid

Icon	Description
	Unknown: Authentication status is unknown or no credentials have been entered.

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6.1. Requirements for Provisioning a Host

CloudForms Management Engine can also provision hosts using PXE and IPMI technologies. To do this, you will need to complete the following steps before you provision your first host.

1. Make a PXE Server accessible to the CloudForms Management Engine Server.

2. Create System images types for the host.

3. Associate images with the image types.

4. Enable IPMI on provisioning hosts and add them to the Red Hat CloudForms Infrastructure.

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6.1.1. PXE Provisioning

PXE is a boot method that allows you to load files from across a network link. CloudForms Management Engine uses it for files required for provisioning virtual machines. PXE can be used for provisioning for either Red Hat Enterprise Virtualization Manager or VMWare.

» Connect to the **PXE Server**.

» Create a **System Image Type**.

» Associate each **PXE** image with an image type.

» Create a customization template.

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6.1.1.1. Connecting to a PXE Server

The following procedure connects to a PXE Server and adds its details to CloudForms Management Engine.

Procedure 6.1. To connect to a PXE server

1. From **Infrastructure**, go to the **PXE** page.

2. Click (**Configuration**), then (**Add a new PXE Server**).

Basic Information

Name	Mahwah
Depot Type	Network File System
URI	nfs:// 192.168.252.60/srv/httpboot/ipx
Access URL	http://192.168.252.60/ipxe
PXE Directory	mac
Windows Images Directory	sources/microsoft
Customization Directory	customization

PXE Image Menus

Filename	menu.php

3. Type a name that will be meaningful in your environment.

4. For Depot Type, select either **Network Files System** (NFS) or **Samba**. The fields to enter in the dialog depend on the Depot Type.

   ➤ For NFS, type in the URI, Access URL, PXE Directory, Windows Image Directory and Customization Directory. When you provision, EVM writes a text file to the PXE Directory. The file is named after the MAC address of the NIC that is assigned to the virtual machine. It contains where to get the kernel and initrd image. This file is removed after a successful provision. The Windows Image Directory is where the files are located on your NFS for the provisioning of Windows operating systems. The **Customization Directory** is where your Kickstart and Sysprep files are located.

   ➤ If using a Depot Type of **Samba**, you will not need **Access URL**, but you will need a User ID, and Password, in addition to the items required for NFS.

5. For PXE Image Menus, type the name of the file for the PXE Boot menu.

6. Click **Add**.

7. Select the new PXE Server from the tree on the left, and click ⚙ (**Configuration**), ↻ (**Refresh**) to see your existing images.

Result:

The PXE server is added to CloudForms Management Engine.

Next, create PXE Image types to associate with the customization templates and to specify if the image type is for a virtual machine, a host, or both.
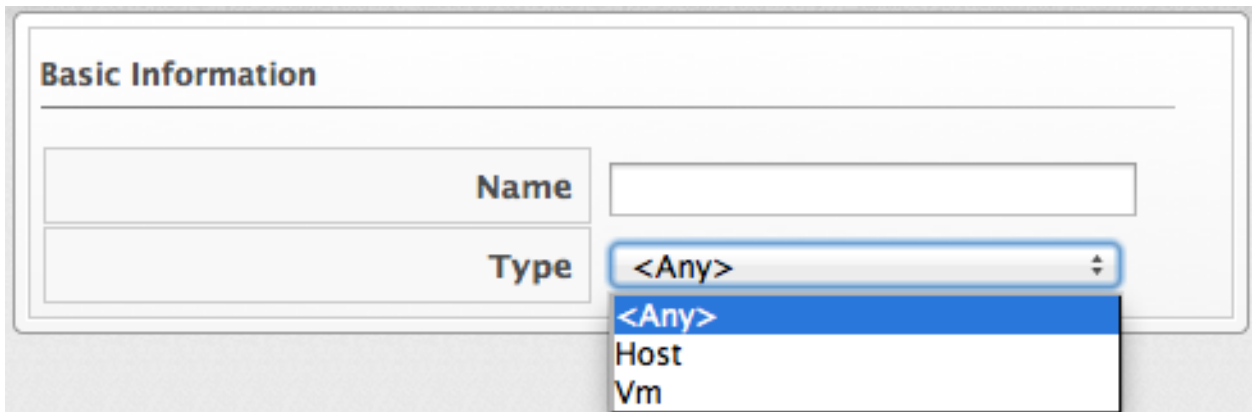
6.1.1.2. Creating System Image Types for PXE

The following procedure creates a system image type for PXE Servers.
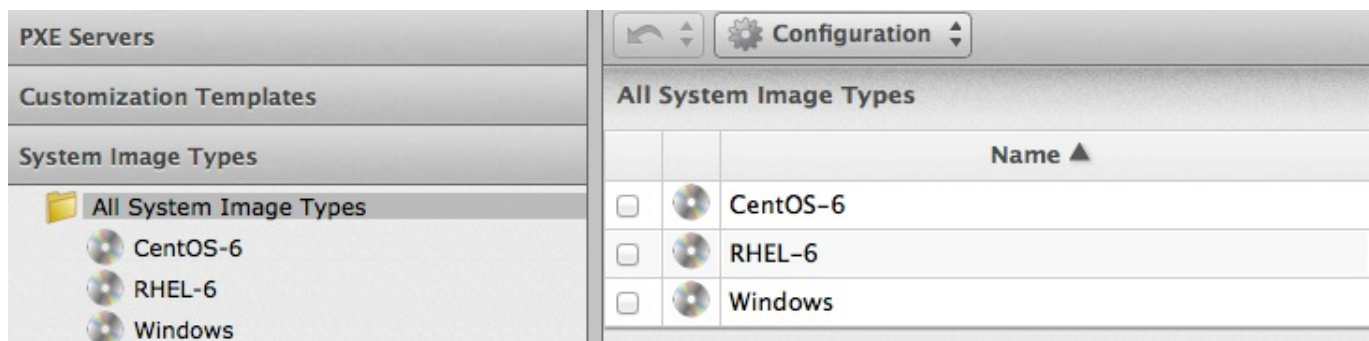
Procedure 6.2. To create System Image Types

1. From **Infrastructure**, **PXE**, click the **System Image Types** accordion.

2. Click ⚙ **Configuration**, then ➕ **(Add a new System Image Type)**.

3. Type in a name and select a type.

   ➤ Use **Host** if you want this image type to only apply to hosts.

   ➤ Use **Vm** if you want this image type to only apply to virtual machines.

   ➤ Use **Any** if this image type can be used for either hosts or virtual machines.

4. Click **Add**.

Result:

The Image Types are added.

After creating the System Image Types, assign the types to each image on your PXE Servers. To do this, you will select each image on the PXE Server and identify its type.
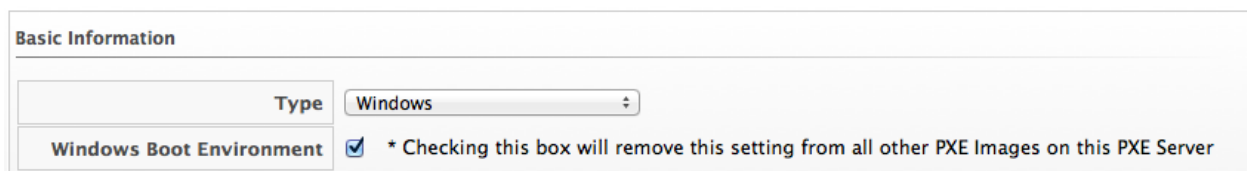
6.1.1.3. Setting the PXE Image Type for a PXE Image

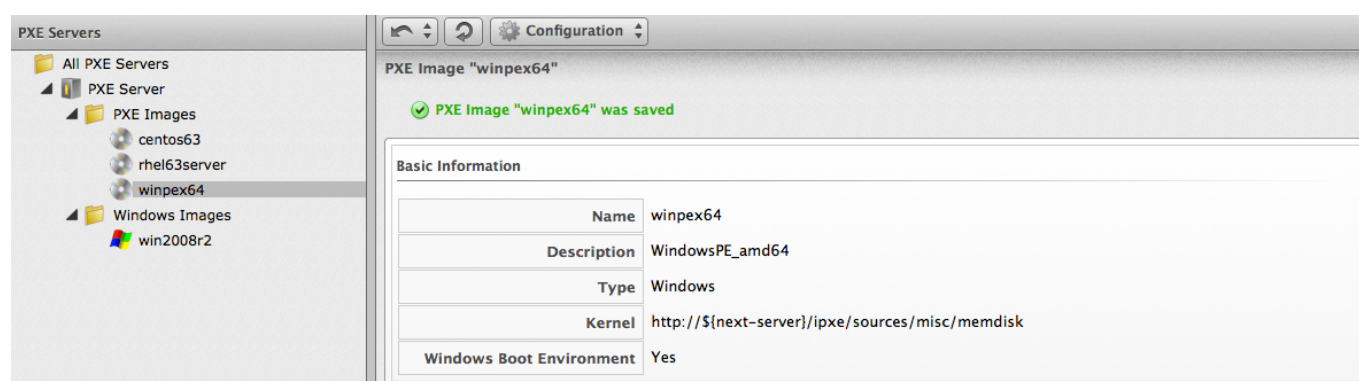The following procedure sets the image type for a chosen PXE image.

Procedure 6.3. To set the PXE Image Type for a PXE Image

1. From **Infrastructure**, go to the **PXE** page.

2. Navigate to the **PXE Server** and image that you want to set a type for.

3. Click ⚙ **(Configuration)**, then ✎ **(Edit this PXE Image)**.

4. From the Basic Information area, select the correct type. If this PXE Image will be used as the Windows Boot Environment, check Windows Boot Environment. At the time of this writing, only one PXE Image can be identified as the Windows Boot Environment. Therefore, checking one as the Windows Boot Environment, will remove that from any other PXE Image with that check.

5. Click **Save**.

Result:

The image type is saved.

Report a bug

6.1.2. ISO Provisioning

CloudForms Management Engine also allows ISO provisioning from Red Hat Enterprise Virtualization Manager Datastores. To use this feature, you will need to do the following before creating a provision request.

1. Add the **ISO Datastore**. The Red Hat Enterprise Virtualization Manager system must have already been discovered or added into the VMDB. For more information, see the **Insight Guide**.

2. Refresh the **ISO Datastore**.

3. Create a **System Image Type**.

4. Set the **ISO Image Type**.

5. **Create** a customization template.

Report a bug

6.1.2.1. Adding an ISO Datastore

The following procedure adds an ISO Datastore from your Red Hat Enterprise Virtualization environment.

Procedure 6.4. To add an ISO datastore

1. From **Infrastructure**, **PXE**, click the **ISO Datastores** accordion.

2. Click ⚙ **(Configuration)**, ➕ **(Add a new ISO Datastore)**.

3. Select the Red Hat Enterprise Virtualization Manager Management System hosting the ISO Datastore.

4. Click **Save**.

Result:

The ISO datastore is added to CloudForms Management Engine.

Report a bug

6.1.2.2. Refreshing an ISO Datastore

The following procedure refreshes the chosen ISO datastore and updates CloudForms Management Engine with available ISOs.

Procedure 6.5. To refresh the ISO Datastore

1. From **Infrastructure**, **PXE**, click the **ISO Datastores** accordion.

2. Select the ISO Datastore.

3. Click ⚙ **(Configuration)**

4. And then click 🔄 **(Refresh)**.

Result:

The ISO datastore refreshes and updates the available ISOs.

Report a bug

6.1.2.3. Creating System Image Types for ISO

The following procedure creates a system image type for ISO Servers.

Procedure 6.6. To create System Image Types

1. From **Infrastructure**, **PXE**, click the **System Image Types** accordion.

2. Click ⚙ **Configuration**, then ➕ **(Add a new System Image Type)**.

3. Type in a name and select a type.

    ≫ Use **Host** if you want this image type to only apply to hosts.

    ≫ Use **Vm** if you want this image type to only apply to virtual machines.

    ≫ Use **Any** if this image type can be used for either hosts or virtual machines.

4. Click **Add**.

Result:

The Image Types are added.

After creating the **System Image Types**, assign the types to each image on your ISO Servers. To do this, you will select each image on the ISO Server and identify its type.

Report a bug

6.1.2.4. Setting the Image Type for an ISO Image

The following procedure sets the image type for an ISO image.

Procedure 6.7. To set the image type for an ISO image

1. From **Infrastructure**, go to the **PXE** page.

2. Navigate to the **PXE Server** and image that you want to set a type for.

3. Click **(Configuration)**, then **(Edit this ISO Image)**.
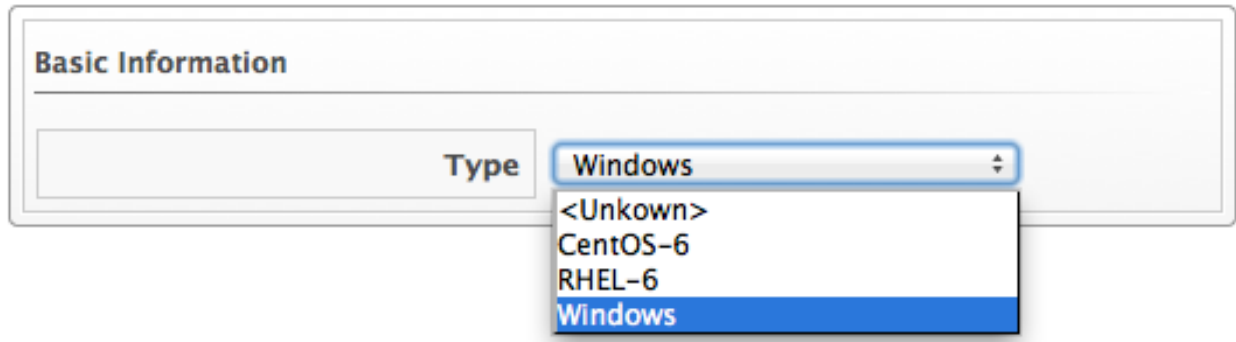
4. From the **Basic Information** area, select the correct **Type**.

5. Click **Save**.

Result:

The image type is saved.

Report a bug

6.1.3. Customization Templates for Host Provisioning

Add a customization template to provide Kickstart files for the initial loading of the operating system. There are certain sections to use to allow for interactions with the provisioning dialogs provided by CloudForms Management Engine.

Report a bug

6.1.3.1. Customization Script Additions

Table 6.1. Customization Script Additions

Customization Type	Reason to Include	Script entries

Customization Type	Reason to Include	Script entries
Kickstart	Takes the values from the Customize tab in Provisioning Dialog and substitutes them into the script.	```#Configure Networking based on values from provisioning dialog <% if evm[:addr_mode].first == 'static' %> <% network_string = "network --onboot yes --device=eth0 --bootproto=static --noipv6" %> <% ["ip", :ip_addr, "netmask", :subnet_mask, "gateway", :gateway, "hostname", :hostname, "nameserver", :dns_servers].each_slice(2) do |ks_key, evm_key| %> <% network_string << " --#{ks_key} #{evm[evm_key]}" unless evm[evm_key].blank? %> <% end %> <%= network_string %> <% else %> network --device=eth0 --bootproto=dhcp <% end %>```
Kickstart	Encrypts the root password from the Customize tab in the Provisioning Dialog.	```rootpw --iscrypted <%= MiqPassword.md5crypt(evm[:root_password]) %>```
Kickstart	Sends status of the provision back to CloudForms Management Engine for display in the CloudForms Management Engine Console.	```# Callback to EVM during post-install wget --no-check-certificate <%= evm[:callback_url_on_post_install] %>```

Report a bug

6.1.3.2. To add a Customization Template

The following procedure adds a customization template to CloudForms Management Engine.

Procedure 6.8. To add a Customization Template

1. From **Infrastructure**, **PXE**, click the **Customization Templates** accordion.

2. Click ![plus icon] **(Add a new Customization Template)**.

3. Type in a name and description.

4. Select the **Image Type**. This list should include the PXE image types you created.

5. In the Type, select Kickstart for Linux based systems, and Sysprep for Windows based system.

6. In the Script area, either paste the script from another source or type the script directly into the CloudForms Management Engine interface.

7. Click **Add**.

Result:

The **Customization Template** is added.

> **Note**
>
> The default dialogs show all possible parameters for provisioning. To limit the options shown, see **Customizing Provisioning Dialogs.**

Report a bug

6.1.4. IPMI Hosts

There are two ways to get the IPMI Host into the VMDB. You can either use the CloudForms Management Engines Discovery process or add the host using its IP address and credentials.

Report a bug

6.1.4.1. Discovering the Management Interface for an IPMI Host

Use the following procedure to discover the management interface for any IPMI hosts.

Procedure 6.9. To discover the management interface for a IPMI host

1. From **Infrastructure**, go to the **Hosts** page.

2. Click **(Configuration)**, then **(Discover Hosts)**.

3. Check IPMI.

4. Type in a range of IP Addresses. For quickest results, use the actual IP address in both fields.

5. Click **Discover**.

Result:

The IPMI host discovery is initiated.

After the host is discovered, you add credentials for IPMI.

Report a bug

6.1.4.2. Adding IPMI Credentials to a Discovered Host

After discovering an IPMI host, add the credentials using the following procedures

Procedure 6.10. To add IPMI credentials

1. From Hosts under Infrastructure, click on the host you want to edit.

2. Click **(Configuration)**, and then **(Edit this Host)**.

3. In the Credentials area, IPMI tab, type in the IPMI credentials

   a. Use **User ID** to specify a login id.

   b. Use **Password** to specify the password for the user ID.

   c. Use **Verify Password** to confirm the password.

4. Click **Validate** to test the credentials.

5. Click **Save**.

Result:

The credentials are added and the changes take effect immediately.

Report a bug

6.1.4.3. Adding the Management Interface for an IPMI Host

Procedure 6.11. Add the Management Interface for the IPMI Host

1. From Infrastructure, go to the Hosts page.

2. Click ⚙ **(Configuration)**, then ➕ **(Add a New Host)**.

3. Type in a name and the IPMI IP address.

4. In the credentials area, IPMI tab, type in the IPMI credentials

    a. Use **User ID** to specify a login id.

    b. Use **Password** to specify the password for the User ID.

    c. Use **Verify Password** to confirm the password.

5. Click **Validate** to test the credentials.

6. Click **Add**.

The IPMI Host is added to the CloudForms Management Engine Environment, any an operating system can now be provisioned onto it.

Report a bug

6.2. Provisioning a Host

After setting up the IPMI and PXE environments, you are ready to provision a host. Currently, you can only provision in the cluster where the template is located or you can create a template in each cluster and let a CloudForms Management Engine Automate method automatically switch the selected template in the provision object.

Procedure 6.12. To provision a Host

1. From **Infrastructure**, go to the **Hosts** page.

2. Select a host with IPMI enabled.

3. Click 🔄 **(Lifecycle)**, then ➕ **(Provision Hosts)**.

4. In **Request Information**, type in at least a first and last name and an email address. This email is used to send the requester status emails during the provisioning. The other information is optional. If the CloudForms Management Engine Server is configured to use LDAP, you can use the **Look Up** button to populate the other fields based on the email address.

5. On the **Purpose** page, select the appropriate tags for the provisioned host.

6. On the **Catalog** page, select the hosts to provision.

   ≫ In the **Host** area, select the hosts you want to provision

   ≫ In the **PXE** area, select the PXE server and image.

7. On the **Customize** page, you can select how you might want to customize the operating system of the new host. These options vary based on the operating system to be provisioned.

   ≫ Use **Credentials** to type in a root password

   ≫ In the **IP Address** area, select either **Static** or **DHCP** and enter any other address information you need. If needed, type in DNS specifications.

   ≫ Under **Customize Template>**, select a script.

8. On the **Schedule** page, decide if you want the provisioning to begin as soon as it is approved, or at a specific time.

⁂ In **Schedule Info**, choose if you want the provisioning to begin as soon as it is approved, or at a specific time. If you select **Schedule**, you will be prompted to enter a date and time.

⁂ Check 'Stateless' if you do not want the files deleted after the provision completes. A stateless provision does not write to the disk so it will need the PXE files on the next boot

9. Click **Submit**.

Result:

The provisioning request is sent for approval. For the provisioning to begin, a user with the admin, approver, or super admin account role must approve the request. The admin and super admin roles can also edit, delete, and deny the requests. You will be able to see all provisioning requests where you are either the requestor or the approver.

Report a bug

6.3. Editing Host Information

Edit information about a host such as the name, IP address, login credentials, and its interaction with its virtual machines. To analyze virtual machines on a host, the host must have valid credentials entered.

Procedure 6.13. To Edit Host Information

1. Navigate to **Infrastructure → Hosts**.

2. Click the Host to edit.

3. Click **Configuration → Edit this Host**.

4. In **Basic Info**, edit the **Host Name** and **IP Address** used to contact the SmartProxy.

   ⁂ Use **Name** to set an easily identifiable name for the host.

   ⁂ Use **Host Name** to specify the hostname for the device.

   ⁂ **IP Address** is the IP address the CloudForms Management Engine uses to communicate with the host.

   ⁂ **IPMI IP Address** and **MAC Address** are used for provisioning hosts.

5. Use **Credentials** to provide login credentials required for this Host.

   ⁂ On the **Default** tab, type a user name with elevated security credentials and the users password. If you are using domain credentials, the format for User ID must be in the format of *[domainname]\[username]*

   ⁂ On ESX hosts, if SSH login is disabled for the **Default** user, type in a user with remote login access on the **Remote Login** tab. If this is not supplied, **Default** credentials are used.

   ⁂ Use **Web Services** to supply credentials for any web service calls made directly to the host system. If this is not supplied, **Default** credentials are used.

   ⁂ Use **IPMI** to supply credentials for your IPMI host for provisioning.

> **Note**
>
> Login credentials are required for performing SmartState Analysis on hosts, virtual machines, and templates.

For each type of credential used, the following information is required:

 * Use **User ID** to specify a login ID.

 * Use **Password** to specify the password for the User ID.

 * Use **Verify Password** to confirm the password.

6. Click **Validate** to test the credentials.

7. Click **Save**.

Result:

This applies the updates to the host and the changes take effect immediately.

Chapter 7. Virtual Machines

The heterogeneous virtual machine container and guest support combined with the ability to analyze information inside the virtual machine - such as disk space, patch level or installed applications - provides in-depth information across the virtual environment. This rich set of information enables CloudForms Management Engine users to improve problem resolution times and effectively manage virtual machines.

The **Virtual Machines** pages display all virtual machines that were discovered by your Server. Note that if you have applied a filter to a user, it will be in effect here. The **Virtual Machines** taskbar is a menu driven set of buttons that provide access to functions related to virtual machines.
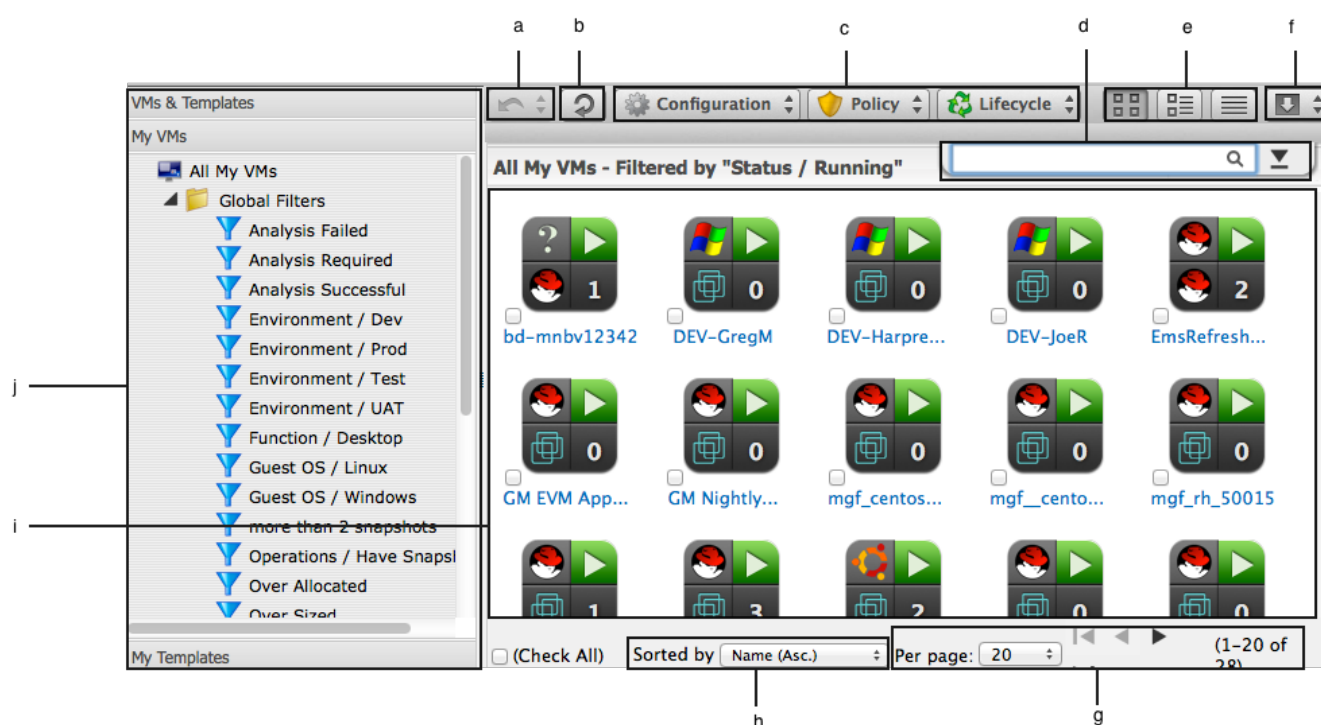
1. History button

2. Refresh screen button

3. Taskbar

4. Name search bar/Advanced Search button

5. View buttons

6. Download buttons

7. Navigation bar

8. Sort dropdown

9. Main area in Grid View

10. Management System/Filter Navigation

Console uses **Virtual Thumbnails** to describe virtual machines and templates. Each thumbnail contains four quadrants by default. This allows you to glance at a virtual machine for a quick view of its contents.

1. Top left quadrant: Operating system of the Virtual Machine

2. Bottom left quadrant: Virtual Machine Hosts software

3. Top right quadrant: Power state of Virtual Machine or Status icon

4. Bottom right quadrant: Number of Snapshots for this Virtual Machine

Icon	Description
	Template: Virtual Template
	Retired: Virtual Machine has been retired
	Archived: Virtual Machine has no Host or Datastore associated with it.
	Orphaned: Virtual Machine has no Host but does have a Datastore associated with it.
	Disconnected: Virtual Machine is disconnected.
	On: Virtual Machine is powered on.
	Off: Virtual Machine is powered off.
	Suspended: Virtual Machine has been suspended.

The **Virtual Machines** page has three accordions organizing your virtual machines and templates in different ways. All of these accordions share a set of common controls

▷ Use **VMs and Templates** to view your virtual machines and templates organized by Management System. In addition, you can see archived and orphaned items here.

▷ Use the **My VMs** to view, apply filters, and collect information about all of your virtual machines.

» Use **My Templates** to view, apply filters, and collect information about all of your templates.

Through the console, you are able to view your virtual machines in multiple ways. For your virtual machines, you can:

» Filter virtual machines

» Change views

» Sort

» Create a report

» Search by MyTags

» Search by collected data

Report a bug

7.1. Provisioning Virtual Machines

When a Virtual Machine is provisioned, it goes through multiple phases. First, the request must be made. The request includes ownership information, tags, virtual hardware requirements, the operating system, and any customization of the request. Second, the request must go through an approval phase, either automatic or manual. Finally, the request is executed. This part of provisioning consists of pre-processing where IP addresses may be acquired or CMDB instances created, processing which consists of creating the Virtual Machine based on information in the request, and post-processing where a CMDB instance may be activated or an e-mail sent to the owner. The steps for provisioning may be modified using CloudForms Management Engine.

Report a bug

7.1.1. Provisioning a Virtual Machine from a Template

Users provision virtual machines through various methods. One method is to provision a virtual machine directly from a template stored on a Management System.

Procedure 7.1. To provision a virtual machine from a template

1. From Services, Virtual Machines, click (**Lifecycle**), and then (**Provision VMs**).

2. Select a template from the list presented.

3. Click **Continue.**

4. On the **Request** tab, enter information about this provisioning request.

In **Request Information**, type in at least a first and last name and an email address. This email is used to send the requester status emails during the provisioning process for items such as auto-approval, quota, provision complete, retirement, request pending approval, and request denied. The other information is optional. If the CloudForms Management Engine Server is configured to use LDAP, you can use the **Look Up** button to populate the other fields based on the email address.

> **Note**
>
> Parameters with a * next to the label are required to submit the provisioning request. To change the required parameters, see **Customizing Provisioning Dialogs**.

5. Click **Purpose** to select the appropriate tags for the provisioned virtual machines.

6. Click **Catalog** to select the template to provision from. This tab is context sensitive based on management system.

   a. For Templates on VMware Management Systems:

   b. For provision type, select either NetApp or VMware.

c. Check **Linked Clone** if you want to create a linked clone to the virtual machine instead of a full clone. Since a snapshot is required to create a linked clone, this box is only enabled if a snapshot is present. Select the snapshot you want to use for the linked clone.

d. Under **Count**, select the number of virtual machines you want to create in this request.

e. Use **Virtual Machine Naming** to specify a virtual machine name and virtual machine description. When provisioning multiple virtual machines, a number will be appended to the virtual machine Name.

7. For Templates on Red Hat Management Systems:

a. For provision type, select either ISO or PXE.

b. For server, select the server where the images are stored.

c. From **Image**, click on the image to use.

d. Under **Count**, select the number of virtual machines you want to create in this request.

e. Use **VM Naming** to specify a Name and description. When provisioning multiple virtual machines, a number will be appended to the **VM Name**.

8. Click **Environment** to decide where you want the new virtual machines to reside.

a. If provisioning from a template on VMware, you can either let CloudForms Management Engine decide for you by checking **Choose Automatically**, or select a specific cluster, resource pool, folder, host, and datastore.

b. If provisioning from a template on Red Hat, you can either let CloudForms Management Engine decide for you by checking **Choose Automatically**, or select a datacenter and cluster.

9. Click **Hardware** to set hardware options such as CPU, memory, and disk format.

VM Hardware

Number of Sockets	1
Cores per Socket	1
Memory (MB)	1024
Disk Format	○ Thick ○ Thin ⊙ Default

VM Limits

CPU (MHz)	-1	(-1 = Unlimited)
Memory (MB)	-1	(-1 = Unlimited)

VM Reservations

CPU (MHz)	0
Memory (MB)	0

    a. In **VM Hardware**, set the number of CPUs, amount of memory, and disk format, thick, thin, or same as the template you are provisioning from.

    b. In **VM Limits**, set the limit of CPU and memory the virtual machine can use.

    c. In **VM Reservation**, set the amount of CPU and memory you want reserved for this virtual machine.

10. Click **Network** to set the vLan adapter. (Additional networking settings that are internal to the operating system appear on the Customize tab.)

Network Adapter Information

vLan *	VM Network

    a. In **Network Adapter Information**, select the **vLan**.

11. Click **Customize** to select how you might want to customize the operating system of the new virtual machine. These options vary based on the *operating system* of the template.
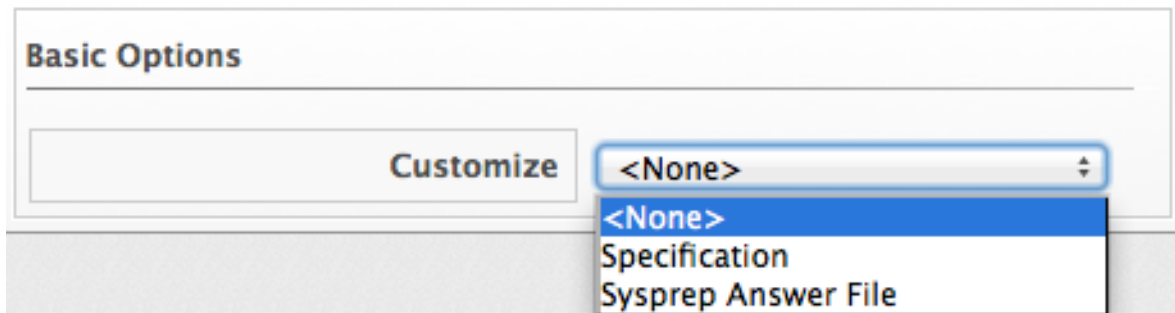
a. To use a customer specification from the Management System, click **Specification**. To select an appropriate template, a list will be provided in the custom specification area. The values that are honored by CloudForms Management Engine will display.

> **Note**
>
> Note that any values in the specification that do not show in the CloudForms Management Engine Console's request dialogs will not be used by CloudForms Management Engine. For example, for Windows operating systems, if you have any run once values in the specification, they will not be used in creating the new virtual machines. Currently, for a Windows operating system, CloudForms Management Engine honors the unattended GUI, ddentification, workgroup information, user data, windows options, and server license. If more than one network card is specified, only the first will be used.
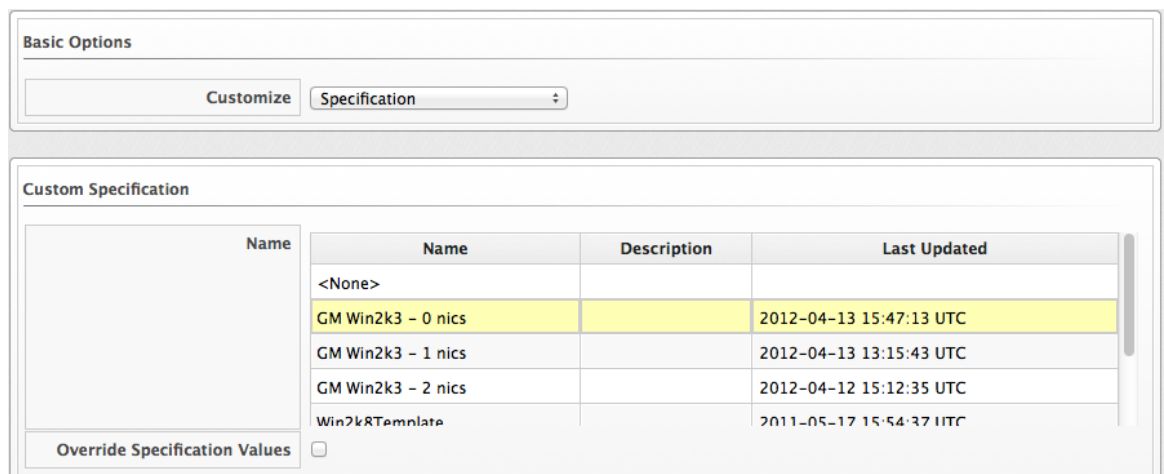
To modify the specification, check **Override Specification Values**.

b. Select **Sysprep Answer File**, to upload a Sysprep file or use one that exists for a custom specification on the Management System where the template resides. To upload a file, click **Browse** to find the file, and then upload. To use an answer file in **Customization Specification**, simply click on the item. The answer file will automatically upload for viewing. You cannot make modifications to it.

12. On the **Schedule** tab, decide if you want the provisioning to begin as soon as it is approved, or at a specific time.

a. In **Schedule Info**, choose if you want the provisioning to begin as soon as it is approved, or at a specific time. If you select **Schedule**, you will be prompted to enter a date and time.

b. In **Lifespan**, select if you want to power on the virtual machines after they are created, and if you want to set a retirement date. If you select a retirement period, you will be prompted for when you want a retirement warning.

13. Click **Submit**.

Result:

The provisioning request is sent for approval. For the provisioning to begin, a user with the admin, approver, or super admin account role must approve the request. The admin and super admin roles can also edit, delete, and deny the requests. You will be able to see all provisioning requests where you are either the requestor or the approver.

Report a bug

7.1.2. Approving a Provisioning Request

After a user creates virtual machine provisioning request, administrators have the ability to approve the request and allow CloudForms Management Engine to complete virtual machine creation.

Procedure 7.2. To approve a provisioning request

1. Log in as a user with EvmRole-administrator (admin) or EvmRole-super_administrator (super administrator) rights to the CloudForms Management Engine Console. (These two account roles are enabled for the virtual machines-Requests-Operate-Approve and Deny feature.)

2. Navigate to **Services**, **Requests**.

3. Click on the request you want to approve.

4. Type in a reason for the approval.

5. Click (**Approve this request**).

Result:

The provision request is sent for completion.

Report a bug

7.2. Controlling Virtual Machines

You can start, stop, and suspend a Virtual Machine through the CloudForms Management Engine Console. To do this, the following requirements must be met:

» The virtual machine must be discovered.

» The virtual machine must be registered to a host and have a SmartProxy associated with it. It may not be on a repository.

Report a bug

7.2.1. Controlling the Power State of a Virtual Machine

Start, stop, and suspend a virtual machine through the CloudForms Management Engine console using the following procedure.

Procedure 7.3. To control the power state of a virtual machine

1. Navigate to **Services → Virtual Machines**.

2. Click the virtual machines that you want to change the power state for.

3. Click (**Power Operations**). Note that the only operations that will be available are the ones that apply to the virtual machines current power state.

4. Click the button for the power operation you want.

   a. Click (**Power On**) to start the selected virtual machines.

   b. Click (**Power Off**) to stop the selected virtual machines.

   c. Click (**Suspend**) to suspend the selected virtual machines.

   d. Click (**Reset**) to stop the selected virtual machines

   e. Click (**Stop Guest**) to stop the guest operating system.

   f. Click (**Restart Guest**) to restart the guest operating system.

5. Click **OK** to confirm the choice you selected.

Result:

The requested action is initiated.

Report a bug

7.3. Analyzing Virtual Machines and Templates

Analyze a virtual machine to collect metadata such as user accounts, applications, software patches, and other internal information. If CloudForms Management Engine is not set up for automatic analysis, perform a manual analysis of a virtual machine. To perform a SmartState analysis, CloudForms Management Engine requires a running SmartProxy with visibility to the virtual machine's storage location. If the virtual machine is associated with a host or management system, ensure the virtual machine is registered with that system to be properly analyzed; the server requires this information since a snapshot might be created.

Report a bug

7.3.1. Red Hat Enterprise Virtualization Prerequisites

7.3.1.1. Storage Support Notes about Analyzing from RHEVM 3.1

Note the following requirements when performing SmartState Analyses on RHEVM 3.1 Virtual Machines.

NFS

» The CloudForms Management Engine Server requires a mount to the NFS Datastore.

iSCSI / FCP

» Cluster must use full Red Hat Enterprise Linux (not Red Hat Enterprise Virtualization Hypervisor) Hosts.

» CFME VM will leverage the DirectLUN Disk to connect to each Storage Domain LUN.

» A CloudForms Management Engine Appliance *must* reside in each Datacenter with the iSCSI / FCP storage type.

» Each CloudForms Management Engine Appliance performing Smart State Analysis requires a *sharable*, *non-bootable* DirectLUN attached for each iSCSI/FCP storage domain.

Other Notes

» **Set Server Relationship** - This is required to allow the VM SmartState Analysis job to determine what datacenter a CloudForms Management Engine Appliance is running in and therefore identify what storage it has access to in a RHEV environment.

   » After setting up a CloudForms Management Engine Appliance and performing a refresh of the Management System, find the CloudForms Management Engine Appliance in the **Virtual Machine** accordion list and view its summary screen.

   » Click **Configuration → Edit Server Relationship**.

   » Select the server that relates to this instance of the CloudForms Management Engine Appliance.

Note

Only one DirectLUN for each storage domain may be mounted at a time.

7.3.1.2. Storage Support Notes about Analyzing from RHEVM 3.0

There are two additional steps required to perform SmartState Analyses on Red Hat Enterprise Virtualization Manager virtual machines that are on iSCSI or FCP storage. NFS storage does not have these requirements.

1. Enable DirectLUN support for the host and CloudForms Management Engine Appliance that performs the analysis.

   ▸ Enable DirectLUN on host.

   ▸ Enable DirectLUN on the CloudForms Management Engine Appliance. To do this, edit the desired Red Hat Enterprise Virtualization storage and get the LUNID value. Then, on the CloudForms Management EngineAppliance virtual machine in the Red Hat Enterprise Virtualization user interface, right-click and select **Edit**+**Custom Properties** and enter the following in the **Custom Properties** edit box:

   ```
   directlun=<LUN ID>:readonly
   ```

   If you have multiple storage domains separate them by a comma, similar to:

   ```
   directlun=<LUN ID 1>:readonly,<LUN ID 2>:readonly,<LUN ID
   N>:readonly
   ```

   Note

   The CloudForms Management Engine Appliance must reside in the same data center as the storage you are trying to connect. If you have multiple data centers with iSCSI or FCP storage, you need a CloudForms Management Engine Appliance in each data center to support virtual machine scanning.

2. Set Server Relationship - This is required to allow the virtual machine SmartState analysis job to determine which data center a CloudForms Management Engine Appliance is running and therefore identify what storage it has access to in a Red Hat Enterprise Virtualization environment.

   a. After setting up a CloudForms Management Engine Appliance and performing a refresh of the Management System, find the CloudForms Management Engine Appliance in the **Virtual Machine** accordion list and view its summary screen.

   b. Click (**Configuration**), and then (**Edit Server Relationship**)

   c. Select the server that relates to this instance of the CloudForms Management Engine Appliance.

7.3.1.3. Upgrades from RHEVM 3.0 to RHEVM 3.1

Environments upgrading from RHEVM 3.0 to 3.1 might include issues regarding SSL communications with CloudForms Management Engine. This issue occurs from version 3.1 due to Apache being used as a front end to handle the SSL requests. The upgrade to 3.1 does not reconfigure the Management System for this. [2]

A change to the RHEVM configuration allow CloudForms Management Engine to use SSL to connect rather than the current TLS.

1. Log into the RHEVM server's terminal as the **root** user.

2. Modify the **/usr/share/ovirt-engine/service/engine-service.xml.in** file.

3. Scroll to **protocols** inside the **ssl** tag. The current value of the is **TLSv1**.

   ```
   <ssl>
     <protocols>TLSv1</protocols>
   </ssl>
   ```

4. Replace the value of the **protocols** attribute with **SSLv3,TLSv1**.

   ```
   <ssl>
     <protocols>SSLv3,TLSv1</protocols>
   </ssl>
   ```

5. Save the file.

6. Restart the RHEVM server.

In addition, set the **Server Relationship** for CloudForms Management Engine.

1. Select the CloudForms Management Server's virtual machine from **Services → Virtual Machines**.

2. Go to **Configuration → Edit Server Relationship** and select the appropriate CloudForms Management Engine Server.

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7.3.2. VMware vSphere Prerequisites

7.3.2.1. Installing VMware VDDK on CloudForms Management Engine

Execution of SmartState Analysis on virtual machines within a VMware environment requires the Virtual Disk Development Kit (VDDK). CloudForms Management Engine supports VDDK 1.2.2.

Procedure 7.4. To install the VDDK on a CloudForms Management Engine appliance

1. Download VDDK 1.2.2 (**VMware-vix-disklib-1.2.2-702422.x86_64.tar** at the time of this writing) from the VMware website.

> **Note**
>
> If you do not already have a login ID to VMware, then you will need to create one. At the time of this writing, the file can be found by navigating to **Support & Downloads → All Downloads → VMware vSphere → Drivers & Tools**. Expand **Automation Tools and SDKs**, and select **Mware vSphere 5.1 Virtual Disk Development Kit**. Alternatively, find the file by searching for it using the **Search** on the VMware site.

2. Download and copy the file **VMware-vix-disklib-1.2.2-702422.x86_64.tar.gz** to the **/root** folder of the appliance.

3. Start an SSH session into the appliance.

4. Extract and install VDDK 1.2.2. using the following commands:

```
# cd /root
# tar -xvf VMware-vix-disklib-1.2.2-702422.x86_64.tar
# cd vmware-vix-disklib-distrib
# ./vmware-install.pl
```

5. Accept the defaults during the installation

```
Installing VMware VIX DiskLib API.
You must read and accept the VMware VIX DiskLib API End User
License Agreement to continue.
Press enter to display it.
Do you accept? (yes/no) yes

Thank you.
What prefix do you want to use to install VMware VIX DiskLib API?
The prefix is the root directory where the other folders such as
man, bin, doc, lib, etc. will be placed.
[/usr]

(Press Enter)

The installation of VMware VIX DiskLib API 1.2.2 build-702422 for
Linux completed successfully. You can decide to remove this
software from your system at any time by invoking the following
command: "/usr/bin/vmware-uninstall-vix-disklib.pl".
Enjoy,
--the VMware team
```

6. Run **ldconfig** in order for CloudForms Management Engine to find the newly installed VDDK library.

> **Note**
>
> Use the following command to verify the VDDK files are listed and accessible to the appliance:
>
> ```
> # ldconfig -p | grep vix
> ```

7. Restart the CloudForms Management Engine appliance.

Result:

The VDDK is now installed on the CloudForms Management Engine appliance. This now allows use of the SmartState Analysis Server Role on the appliance.

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7.3.3. Performing SmartState Analysis on a Virtual Machine or Template

Perform a SmartState Analysis of a configuration item to get updated information. To analyze, a SmartProxy is required to have visibility to the virtual machine's storage location and a management system so that a snapshot can be created.

Procedure 7.5. To perform a SmartState Analysis on a virtual machine or template

1. Navigate to **Services → Virtual Machines**.

2. Click the accordion for the items to analyze.

3. Click the **Virtual Machine** or **Template** to analyze.

4. Click (**Configuration**), and then (**Perform SmartState Analysis**) on the Taskbar.

5. Click **OK** to confirm the analysis.

Result:

The SmartProxy runs an analysis on the configuration item and returns the new data.

> **Important**
>
> SmartState Analysis for virtual machines runs as a process independent from other infrastructure items. For example, a successful SmartState Analysis of a host does not mean SmartState Analysis for virtual machines will be successful. Ensure to enter credentials for the host that contains the virtual machine for the SmartState Analysis to work.

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[2] This is documented in the following link on Red Hat Bugzilla:
https://bugzilla.redhat.com/show_bug.cgi?id=893979

Security

A.1. Configuring Firewall for CloudForms Management Engine

These following procedure contains instructions on how to configure the firewall on CloudForms Management Engine.

Procedure A.1. To configure the firewall

1. Run each of the following commands to add the **iptable** configuration rules to memory. Each rule is added and followed in sequence order.

   Table A.1. Firewall commands

Command	Reason
`iptables -A INPUT -m state --state ESTABLISHED,RELATED -j ACCEPT iptables -A INPUT -p tcp --dport ssh -j ACCEPT`	Allow SSH.
`iptables -A INPUT -p tcp --dport 443 -j ACCEPT`	Allow tcp SSL.
`iptables -A INPUT -p udp --dport 443 -j ACCEPT`	Allow udp SSL.
`iptables -A INPUT - p tcp -- dport 5432 -j ACCEPT`	Allow remote connections to PostgreSQL. PostgreSQL only allows **root** login. Only the appliance running the VMDB needs this port open. If that appliance is not using the PostgreSQL database, this port should remain closed. Do not run this command if this appliance is not hosting the VMDB. Refer to Example A.1, "Change default configuration to limit PostgreSQL communication" to only allow connections to PostgreSQL from approved IP addresses.
`iptables -A INPUT -p icmp -j ACCEPT`	Allow icmp.
`iptables -A INPUT -m limit --limit 5/m -- limit-burst 7 -j LOG --log-prefix '**iptables drop**' --log-level 4`	Log any dropped packets to /var/log/messages.
`iptables -A INPUT -j DROP`	Drop any traffic that doesn't match above.
`iptables -I INPUT 1 -i lo -j ACCEPT`	Insert this rule as first in chain allow loop back connections.
`iptables -A OUTPUT -p icmp -j ACCEPT`	Output icmp packets.
`iptables -A FORWARD -p icmp -j ACCEPT`	Forward icmp packets.

2. Save the file with the configuration using the following command.

```
# service iptables
```

This command creates **/etc/sysconfig/iptables**, which looks similar to:

```
# Generated by iptables
# Generated by iptables
-
save v1.3.5 on T
ue Oct 5 11:55:42 2010
*filter
:INPUT ACCEPT [12246:3938412]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [55985:245536782]
-A INPUT -i lo -j ACCEPT
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p tcp -m tcp --dport 22 -j ACCEPT
-A INPUT -p tcp -m tcp --dport 443 -j ACCEPT
-A INPUT -p udp -m udp --dport 443 -j ACCEPT
-A INPUT -p tcp -m tcp --dport 5432 -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -m limit --limit 5/min --limit-burst 7 -j LOG --log-prefix
"**iptables drop**"
-A INPUT -j DROP
-A FORWARD -p icmp -j ACCEPT
-A OUTPUT -p icmp -j ACCEPT
COMMIT
# Completed on Tue Oct 5 11:55:42 2010
```

Result:

The firewall is configured for your CloudForms Management Engine appliance.

Copy the **/etc/sysconfig/iptables** file to any other CloudForms Management Engine appliance's respective **/etc/sysconfig** directory and restart the firewall for each server using the following command:

```
# service iptables restart
```

Please note the following:

❧ If modifying the iptables file directly, restart the firewall after saving the file by typing:

```
# service iptables restart
```

❧ To update **/etc/sysconfig/rsyslog** to only log fatal errors to the console, add the following line:

```
KLOGD_OPTIONS="-x -c 1"
```

❧ To check firewall status, type:

```
# service iptables status
```

Example A.1. Change default configuration to limit PostgreSQL communication

The commands shown in the table below change the firewall configuration for PostgreSQL.

Command	Reason
`iptables -A INPUT -s 192.168.0.0/16 -p tcp --dport 5432 -j ACCEPT`	Allow only IP addresses in 192.168.x.x subnets.
`iptables -A INPUT -s 192.168.20.0/24 -p tcp --dport 5432 -j ACCEPT`	Allow only AP addresses in 192.168.20.x subnet.

To make these changes, use one of the following options:

» Flush the existing rules using `iptables -F`. Add the rules in sequence order shown in Table A.1, "Firewall commands" substituting the port 5432 line with one of the examples. Save the new configuration as shown in Table A.1, "Firewall commands".

» Change the current `/etc/sysconfig/iptables` file substituting the port 5432 line with one of the examples. Follow the same format that exists in the `iptables` file. Restart the firewall using:

```
service iptables restart
```

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A.2. CloudForms Management Engine Ports Reference

Table A.2. Ports used by CloudForms Management Engine

Initiator (CFME Role if applicable)	Receiver (CFME Role if applicable)	Application	TCP Port	UDP Port	Purpose/Reason
Administrator (Internet Browser)	CFME Appliance (User Interface)	HTTPS	443		Access to CFME Appliance User Interface
Administrator (Internet Browser)	CFME Appliance (User Interface)	HTTP	80		Redirect Web Browser to HTTPS service (443)
Service Catalog or other integration through Web Service	CFME Appliance (Web Service)	HTTPS	443		Access to CFME Appliance Web Service
CFME Appliance (SmartProxy)	RHEV-M Server	HTTPS	8443		API communications to RHEV-M environment (Inventory, Operations, SmartProxy)

Initiator (CFME Role if applicable)	Receiver (CFME Role if applicable)	Application	TCP Port	UDP Port	Purpose/Reason
CFME Appliance (C&U)	RHEV-M Server	PostgreSQL	5432		RHEV-M History Database (Database connectivity not enabled by default). See How to access RHEV-M Postgres DB from remote machine.
CFME Appliance	RHEVH Hosts or RHEL Hypervisors	SSH	22		SSH connections.
CFME Appliance	RHEVH Hosts or RHEL Hypervisors	DirectLUN			Direct LUN hook must be installed and enabled for embedded VM scanning on FC or iSCSI storages. Not a tcp/udp connection.
CFME Appliance	NFS Server	NFS	2049	2049	Embedded NFS VM scanning
CFME Appliance(Management System Inventory, Management System Operations, C & U Data Collection, SmartProxy)	vCenter	HTTPS	443		CFME Appliance running any of these roles will initiate communication with vCenter on this port.
CFME Appliance (SmartProxy)	ESX, ESXi Host	HTTPS	443		CFME Appliance
CFME Appliance (SmartProxy)	ESX Hosts(if analyzing VMs through Host)	SOAP over HTTPS	902		Communication from CFME Appliance to Hosts.
CFME Appliance (SmartProxy)	vCenter (if analyzing VMs through VC)	SOAP over HTTPS	902		Communication from CFME Appliance to vCenters.
CFME Appliance(SmartProxy)	ESX Hosts (not needed for ESXi)	SSH	22		CFME Appliance console access (ssh) to ESX hosts
CFME Appliance (User Interface)	Any Virtual Machine	TCP	903		VM Remote Console (if using MKS plugin)
CFME Appliance (User Interface)	Any Virtual Machine	TCP	5900		VM Remote Console (if using VNC)
CFME Appliance (any role)	CFME Appliance running the VMDB (or MS SQL)	PostgreSQL Named Pipes	5432 (1433 MS SQL)		CFME Appliance connectivity to the CFME Database (PostgreSQL or MS SQL)

Initiator (CFME Role if applicable)	Receiver (CFME Role if applicable)	Application	TCP Port	UDP Port	Purpose/Reason
CFME Subordinate Region VMDB Appliance(Database Synchronization)	CFME Master Region VMDB Appliance	PostgreSQL Named Pipes	5432 (1433 MS SQL)		Regional VMDB node replication up to Master VMDB node (PostgreSQL only)
CFME Appliance(Authentication through LDAP)	LDAP Server (AD or other)	LDAP	389		LDAP integration
CFME Appliance (Authentication through LDAPs)	LDAP Server (AD or other)	LDAPs	636		LDAPS integration
SNMP Agent	CFME Appliance (Alert Processor)	SNMP (UDP)		161	SNMP Polling
CFME Appliance (Alert Processor)	SNMP Server	SNMP (TCP)	162		SNMP Trap Send
CFME Appliance (Alert Processor)	Mail server	SMTP	25		SNMP Trap Send
CFME Appliance (any role)	NTP Server	NTP		123	Time Source
CFME Appliance	CFME SmartProxy installed on Windows or Linux	HTTPS	1139		Communication with SmartProxy
CFME SmartProxy installed on Windows or Linux	CFME Appliance	HTTPS	443		SmartProxy Heartbeat
CFME Appliance	DNS Server	UDP		53	DNS Lookups

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Revision History

| **Revision 1.0-0** | **Fri Jan 30 2015** | **CloudForms Docs Team** |

Update product name to Red Hat CloudForms